What is Claimed Is:

1. A WDM fiber optical ring network architecture for communicating information in a metro access arena using one or more wavelengths, which can be shared by a plurality of user terminals, comprising:

a fiber optical feeder ring;

at least one fiber optical distribution ring;

a network node (NN);

at least one access node (AN) said network node and said at least one access node connected via said fiber optical feeder ring; and

at least one end station (ES) connected via said fiber optical distribution ring to said at least one access node, wherein said user terminal is attached to said at least one end station.

2. The architecture according to claim 1, wherein said fiber optical feeder ring is transparent.

3. The architecture according to claim 1, wherein said fiber optical distribution ring is transparent.

4. The architecture according to claim 1, wherein said fiber optical feeder ring is unidirectional.

5. The architecture according to claim 1, wherein said network node provides optical carriers for said fiber optical feeder ring and said network node further comprises:

a plurality of WDM sources:

a corresponding plurality of WDM receivers;

a multiplexer: and

a demultiplexer.

6. The architecture according to claim 1, wherein said at least one access node further comprises an optical add-drop multiplexer (OADM), further wherein said OADM defines distribution loops in which a single wavelength forms a virtual ring, said virtual ring being accessible by said at least one end station.

7. The architecture according to claim 6, wherein said OADM is static.

8. The architecture according to claim 7, wherein said static OADM consists of pairs of waveguide grating routers (WGRs).

9. The architecture according to claim 7, wherein said static OADM consists of a single waveguide grating router (WGR).

10. The architecture according to claim 6, wherein said OADM is reconfigurable.

11. The architecture according to claim 1, wherein said at least one access node further comprises an optical amplifier for simultaneously amplifying all wavelengths on the fiber optical feeder ring.

12. The architecture according to claim 1, wherein said End Station further comprises an optical amplifier used as a channel equalizer in order to compensate for a loss in said fiber optical distribution loop and associated optical components allowing said optical amplifiers to be shared over all wavelengths.

13. The architecture according to claim 1, wherein information comprises:

downstream data packets;

optical chalkboard packets consisting of a recognizable pattern; and

control signals.

14. The architecture according to claim 1, wherein said at least one end station further comprises:

a receiver for downstream packets; and

a semiconductor optical amplifier (SOA), which amplifies and modulates light to create upstream data.

15. The architecture according to claim 1, wherein said at least one end station further comprises:

a receiver for downstream packets; and

a polarization independent modulator.

16. The architecture according to claim 14, wherein said SOA is wavelength independent and impresses data on the optical carriers provided to said wavelength independent modulators by said network node.

17. The architecture according to claim 5, wherein one of said plurality of WDM sources and said multiplexer create data packets at a wavelength, said data packets being sent downstream over said WDM fiber optical ring network, and further wherein one of said plurality of corresponding WDM receivers detects data packets is sent upstream.

18. The architecture according to claim 14, wherein said at least one end station further comprises a passive splitter, which taps a portion of said light for one of said plurality of corresponding receivers to decode downstream packets and passes a remaining portion of said light to said SOA.

19. The architecture according to claim 18, wherein said plurality of corresponding receivers convert said downstream packets into electrical signals.

20. A WDM fiber optical ring network architecture for communicating information in a metro access arena using one or more wavelengths, which can be shared by a plurality of user terminals comprising:

a pair of counter-propagating fiber optical feeder rings:

at least one fiber optical distribution ring;

a network node (NN);

at least one access node (AN), said network node and said at least one access node being connected via said pair of counter-propagating fiber optical feeder rings; and

at least one end station (ES), said at least one end station connected via said at least one counter-propagating fiber optical distribution ring to said at least one access node, wherein said user terminal is attached to said at least one end station.

21. The architecture according to claim 20, wherein said at least one fiber optical distribution ring comprises a pair of counter-propagating fiber optical distribution rings.

22. The architecture according to claim 20, wherein said network node provides optical carriers for said pair of counter-propagating fiber optical feeder rings and said network node further comprises:

a plurality of WDM transceivers for each pair of counter-rotating fiber optical feeder rings;

a multiplexer; and

a demultiplexer.

23. The architecture according to claim 22, wherein said plurality of WDM transceiver comprises:

a plurality of WDM sources for each pair of counter-propagating fiber optical feeder rings; and

a plurality of corresponding WDM receivers for each pair of counter-propagating fiber optical feeder rings.

24. The architecture according to claim 20, wherein said network node provides optical carriers for each said pair of counter-propagating fiber optical feeder rings and said network node further comprises:

a plurality of WDM transceivers for each pair of counter-propagating fiber optical feeder rings;

an optical splitter; and

an optical bandpass filter.

25. The architecture according to claim 20, wherein said network node provides optical carriers for each said pair of counter-propagating fiber optical feeder rings and said network node further comprises a plurality of WDM transceivers for each pair of counter-propagating fiber optical feeder rings.

26. The architecture according to claim 22, wherein said at least one access node further comprises an optical add-drop multiplexer (OADM).

27. The architecture according to claim 22, wherein said at least one access node further comprises a frequency-cyclic OADM.

28. The architecture according to claim 22, wherein said at least one access node further comprises at least one waveguide grating router (WGR).

29. The architecture according to claim 22, wherein said at least one end station further comprises:

a pair of circulators: and

a pair of transceivers.

30. The architecture according to claim 28, wherein said fiber optical distribution ring is implemented using two wavelengths separated by at least one WGR's free-spectral range (FSR).

31. The architecture according to claim 29, wherein said at least one end station further comprises a coarse multiplexer and demultiplexer pair.

32. The architecture according to claim 20, wherein said pair of counter-propagating fiber optical feeder rings allow protection from a single point of failure such that the bi-directional transmission is preserved and the MAC protocol can be applied even after the failure, wherein said single point of failure is from one of a link and said network node and one of said access nodes.